Association of Salmon Fishery Boards

Response to the marine licence application for the MeyGen tidal power development September 2012

Introduction

The Association of Salmon Fishery Boards is the representative body for Scotland's 41 District Salmon Fishery Boards (DSFBs) including the River Tweed Commission (RTC), which have a statutory responsibility to protect and improve salmon and sea trout fisheries. The Association and Boards work to create the environment in which sustainable fisheries for salmon and sea trout can be enjoyed. Conservation of fish stocks, and the habitats on which they depend, is essential and many DSFB's operate riparian habitat enhancement schemes and have voluntarily adopted 'catch and release' practices, which in some cases are made mandatory by the introduction of Salmon Conservation Regulations. ASFB creates policies that seek where possible to protect wider biodiversity and our environment as well as enhancing the economic benefits for our rural economy that result from angling. An analysis completed in 2004 demonstrated that freshwater angling in Scotland results in the Scottish economy producing over £100 million worth of annual output, which supports around 2,800 jobs and generates nearly £50million in wages and self-employment into Scottish households, most of which are in rural areas.

The evidence available to date strongly indicates that the Pentland Firth is of significant strategic importance as a migration route for Scottish Atlantic salmon. In the absence of site-specific information relating to the use of the development area by migratory fish species and the absence of a suitable monitoring strategy to fill this data gap, we have no choice but to operate under the assumption that the Inner Sound represents the primary migration route for all Salmon returning to North Coast and East Coast rivers and a significant migration route for West Coast rivers.

As stated above, DSFBs have a statutory duty to protect and improve salmon and sea trout *fisheries.* All salmon fishing rights in Scotland (freshwater and marine) are private heritable titles. As the environmental effects of offshore technologies are uncertain, we would expect that developers should be required to remedy any negative consequences of such developments on the heritable assets and the value of those assets (including employment within the fishery) of all fishery proprietors. We therefore believe that, as a condition of consent (should such consent be granted), there should be a requirement for a formal mitigation agreement between the developer and relevant DSFBs.

Overarching Comments

1. Designated Species

As highlighted in the Environmental Statement 17 Scottish rivers are designated as Special Areas of Conservation (SAC), part of the Natura 2000 network – a series of internationally important wildlife sites throughout the European Union. The conservation objectives for these sites are set out below[1].

> *To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for each of the qualifying features; and*
>
> *To ensure for the qualifying species that the following are maintained in the long term:*
>
> - *Population of the species, including range of genetic types for salmon, as a viable component of the site*
> - *Distribution of the species within site*
> - *Distribution and extent of habitats supporting the species*
> - *Structure, function and supporting processes of habitats supporting the species*
> - *No significant disturbance of the species*

[1] http://gateway.snh.gov.uk/sitelink/index.jsp

- *Distribution and viability of freshwater pearl mussel host species*
- *Structure, function and supporting processes of habitats*

The Habitats Directive (article 6) requires that *Member States shall take appropriate steps to avoid, in the special areas of conservation, the deterioration of natural habitats and the habitats of species as well as disturbance of the species for which the areas have been designated, in so far as such disturbance could be significant in relation to the objectives of this Directive.*

It also states: *In the light of the conclusions of the [appropriate] assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public*.

If this is not the case and there are no alternative solutions, the proposal can only be allowed to proceed if there are imperative reasons of overriding public interest.

The conservation status of the Atlantic salmon qualifying interest for the salmon SACs in Scotland (First Assessment Cycle) are set out in Table 1 below. In addition, a number of these SACs are also designated for FW pearl mussel.

SAC	Qualifying Interest	Conservation Status
Berriedale & Langwell Waters	Atlantic salmon	unfavourable recovering
Endrick Water	Atlantic salmon	unfavourable recovering
Langavat	Atlantic salmon	unfavourable recovering
Little Gruinard River	Atlantic salmon	unfavourable recovering
North Harris	Atlantic salmon	unfavourable recovering
River Bladnoch	Atlantic salmon	unfavourable recovering
River Borgie	Atlantic salmon	unfavourable recovering
River Dee	Atlantic salmon	favourable maintained
River Moriston	Atlantic salmon	unfavourable recovering
River Naver	Atlantic salmon	unfavourable recovering
River Oykel	Atlantic salmon	unfavourable recovering
River South Esk	Atlantic salmon	unfavourable recovering
River Spey	Atlantic salmon	unfavourable recovering
River Tay	Atlantic salmon	favourable maintained
River Teith	Atlantic salmon	unfavourable recovering
River Thurso	Atlantic salmon	unfavourable recovering
River Tweed	Atlantic salmon	unfavourable recovering

Table 1*: Conservation status of SACs for Atlantic salmon in the area of the development.*

In all cases, with the exception of the Berriedale and Langwell Waters SAC, the Salmon rod catch trends in these SACs as analysed by Marine Scotland Science, show that the spring stock component is in decline. The second assessment cycle is nearing completion, and the results of this assessment must be taken into account in the licensing decision. We believe that the assessment is likely to show that the early running spring component of many of these Atlantic salmon populations continues to deteriorate.

In addition, District Salmon Fishery Boards have a statutory obligation to protect sea trout. The marine phases of both Atlantic salmon and sea trout have also been included on the draft list of Priority Marine Features drawn together by SNH - the habitats and species of *greatest conservation importance* in inshore waters.

2. Climate Change Mitigation and Adaptation

As for many other species, climate change has been identified as a threat to Atlantic salmon. The species' developmental rate is directly related to water temperature, and increasing temperature in freshwater may result in smolts developing more rapidly and entering the ocean at a suboptimal time in relation to their planktonic food sources.

In addition, as air temperatures warm, much of the snow that feeds the river systems is expected to melt earlier. This will lead to a reduction in the flow of many rivers in the spring and summer, which will increase water temperatures further and may reduce the overall optimal habitat available to the Atlantic salmon. It is also clear that survival of salmon and sea trout during their marine migration phase has fallen over the last 40 years. Some of this reduced survival can be explained by changes in sea surface temperature and subsequent contraction of feeding grounds.

The first priority in mitigating these effects is to control atmospheric concentrations of greenhouse gases and we note that the Scottish Government has committed to meeting a stated target of 50% of Scotland's electricity demand from renewable sources by 2020. However, with further climate change inevitable in the short to medium term, attention is now focusing on the development of accommodation and adaptation strategies, through which adverse effects on species or ecosystems can be minimized. Some of the key needs with respect to developing adaptation strategies for rivers and their biodiversity were summarised by Ormerod (2009 – *Aquatic Conserv: Mar. Freshw. Ecosyst.* 19: 609–613).We would highlight the following key point in particular: *to minimize the adverse effects on river biodiversity of actions taken to mitigate climate change*.

3. Potential Negative Effects of Offshore Renewable Devices

Offshore renewable developments have the potential to directly and indirectly impact anadromous fish such as Atlantic salmon and sea trout. We would therefore expect developers to assess the potential impacts of deployed devices on such fish during the deployment, operation and decommissioning phases. Such potential impacts have been highlighted by Marine Scotland Science and could include:

- Avoidance (including exclusion from particular rivers and subsequent impacts on local populations);
- Disorientation effects that could potentially affect behaviour, susceptibility to predation or by-catch; and
- Impaired ability to locate normal feeding grounds or river of origin; and delayed migration

ASFB therefore recommend to our members that careful consideration should be given to the following activities:

i. Subsea noise during construction

A recent review commissioned by SNH[2] states that 'Marine renewable energy devices that require pile driving during construction appear to be the most relevant to consider, in addition to the time scale over which pile driving is carried out, for the species under investigation'.

ii. Subsea noise during operation

iii. Electromagnetic fields (EMFs) arising from cabling

The SNH-commissioned review (cited above) has shown that EMFs from subsea cables have the potential to interact with European eels and possibly salmonids if their migration or movement routes take them over the cables, particularly in shallow waters (<20m). Marine Scotland Science are currently undertaking a research programme which aims to investigate electro-magnetic force impacts on salmonids. We would

[2] Literature review on the potential effects of electromagnetic fields and subsea noise from marine renewable energy developments on Atlantic salmon, sea trout and European eel. Available at: http://www.asfb.org.uk/wp-content/uploads/2011/06/SNH-EMF-Report1.pdf

hope to have some results from this work later in 2012. It is vital that all cables are appropriately shielded to ensure that EMF effects are below any threshold of effect for salmonids.

iv. *EMFs arising from operation of devices*
It is important to ensure that such effects are quantified and assessed in the Environmental Statement.

v. *Disturbance or degradation of the benthic environment (including secondary effects on prey species)*
It is important to ensure that such effects are quantified and assessed in the Environmental Statement.

vi. *Aggregation effects*
Whilst the aggregation of prey items around physical structures might be seen as a positive effect, possible negative effects might include the associated aggregation of predators.

4. General Comments on the Application

Guidance issued by Marine Scotland Science relating to information requirements on diadromous fish of freshwater fisheries interest states that an Environmental Statement should provide information on the use of the development area by such fish and that if such information was lacking then a suitable monitoring strategy should be devised. No monitoring strategy is set out in the application and we believe that the lack of meaningful monitoring in the present proposal is extremely disappointing and completely inadequate. We welcome the fact that the developers have accepted that there remains significant uncertainty around a number of the potential identified impacts and have committed to conduct monitoring to validate the conclusions in the application. We welcome this undertaking, but we would emphasise that any monitoring strategies must include pre-construction monitoring in order that baseline information on salmon and sea trout movement, abundance, swimming depth, feeding behaviour etc. can be collected. We do not have any strong preference over whether such monitoring should fall under project specific monitoring or strategic, collaborative monitoring as set out in section 2.22.

Specific comments

Our specific comments relate to the potential effects highlighted in Section 3 above and are primarily concerned with Section 13 (Fish Ecology).

13.2 Assessment Parameters (and 2.2 Consideration of Design Options)

As with other applications for offshore renewable energy, the Rochdale Envelope approach is set out in the application. Whilst the developer sets out the legal precedent for such an approach, it must be emphasised that this approach makes it extremely difficult for stakeholders to assess the potential environmental risk as there is little detailed information on: the likely size of the scheme; the type of devices to be deployed; and the degree of confidence attached to the assessment of impacts. Our comments must therefore be viewed on that basis.

13.5 Baseline Description

13.46: This section states: '*Based on the available information and taking a precautionary approach it is assumed that Atlantic salmon do pass through the Inner Sound during their migrations to and from the sea as well as the rest of the Pentland Firth. It is also assumed that both Adult salmon and smolts pass through the turbine deployment area although evidence may point to the contrary; that smolts and adult salmon may pass over the turbines or avoid areas of high current velocities*.' Whilst we welcome the recognition that Atlantic salmon do pass through the Inner Sound, there has been no attempt to assess what proportion of smolts and returning adults use this area. Such an assessment is crucial to many of the assumptions made later in the application, particularly those relating to the probability of fish colliding with devices. No evidence is presented to support the assumption that fish use the rest of the Pentland Firth during their migrations. In the absence of such evidence, and until contrary evidence is presented, we have no choice but to operate under the assumption that the Inner Sound represents the primary migration route for all Salmon returning to North Coast and East Coast rivers and a significant migration route for West Coast rivers.

13.6 Impacts during Construction and Installation

Impact 13.3: Noise
13.157 and Impact Significance: We welcome the recognition there are limitations on these assessment criteria and further work in this area is required. However, it is not clear what potential mitigation measures might be available should the assessment prove to be inaccurate. We would expect such mitigation measures to be clearly laid out and, if they prove to be adequate/ appropriate, for these to be set out as a clear condition of consent.

13.7 Impacts during Operations and Maintenance

Impact 13.13: Increase of available habitat
We do not agree with the conclusions of this section. Whilst we agree that the device foundations and cable protection are likely to be colonised by numerous marine organisms and that these structures could act as a refuge for some fish and prey species, we believe that the potential benefits of such effects are overstated. Indeed, in the case of wild salmonids the effect may be negative and significant. It is likely that such structures will act as fish aggregation devices (FADs), rather than actually increasing overall biomass of such species. However, if the structures do act as FADs we would also be concerned that such areas may in fact represent new 'pinch points' for predation of migrating smolts and returning adults. This possibility does not appear to be considered in the application.

Impact 13.14: Noise
13.214: This paragraph asserts that an expected strong avoidance reaction would only occur when fish are in close proximity to the foundations. However, it must be noted that salmonid smolts are physiologically stressed in adapting to the environmental challenge of movement between freshwater and seawater. Simultaneous challenge from noise, EMFs etc. during this transition will constitute a significant additional stressor. Stress leads to increased plasma levels of the stress hormone cortisol. Corticosteroids cause a range of secondary effects, including hydromineral imbalance and changes in intermediary metabolism (Wendelaar Bonga, 1997)[3]. In addition, tertiary responses extend to a reduction in the immune response and reduced capacity to tolerate subsequent or additional stressors (Wendelaar Bonga, 1997). It is also important to recognise that the significance of such an avoidance effect requires an understanding of its consequences. The ES assumes that the displacement and the adoption of avoidance behaviour by individual or aggregations of salmon and sea trout from their original locations as a result of underwater noise has no implications in respect of fitness or survival. We do not believe that this assertion can be substantiated as it may lead to significant physiological stress or increased risks of predation.

Impact 13.15: Electromagnetic fields (EMF)
The assessment of the effects of EMFs is limited to EMFs related to the cabling. No consideration is given to the possibility of EMFs arising from the operation of the devices themselves. We would seek clear evidence that no such EMFs are generated by the tidal devices proposed for installation, or a clear risk assessment, should such devices generate EMFs. In the absence of such evidence the potential risks to migratory salmonids arising from EMFs cannot be adequately assessed.

13.223: We welcome the recognition that, '*it is still generally considered that the current state of knowledge regarding the EMF emitted from subsea power cables is too variable and inconclusive to make an informed assessment of any possible environmental impact of EMF*.'

13.230: This paragraph makes clear that 'it is not known to what extent the exact magnitude of the iE-field (induced electric field) emissions will be from the cables used for the array but it is considered likely to be low'. However, the basis for this assertion is not clear. We are aware that Marine Scotland Science are currently undertaking a research programme which aims to investigate electro-magnetic force impacts on salmonids. Until this work is completed, we are unable to assess the relative magnitude of any impact. We note from section 1.10

[3] Wendelaar Bonga, S. E. (1997). The stress response in fish. *Physiol.l Rev.* 77, 591-625.

that each turbine will have its own export cable to shore and that the cables will be laid across the seabed. However, no alternative solutions are assessed. For example, what would be the EMF implications if intra-array cables were utilised, and only one export cable to shore was used? The sea bed geology means that cables cannot reasonably be buried. However, we would expect other mitigation measures, such as rock burial, to be assessed should the MSS study demonstrate likely impacts on salmonids.

13.231: This paragraph is confusing and contradictory. On the one hand the developer asserts that organisms moving *parallel* to the cable will not generate an iE-field. The developer then goes on to assert that as salmon will move with the flow (with cables laid across the flow), the iE-field will be reduced. The developers also state that for other species that are not migrating through the area this will mean that impacts will only occur when fish are orientated in the same direction as the cables. More clarity is required in order to assess the risks to migratory salmonids.

Impact 13.16: Barriers to movement

13.246/ 13.247: No evidence is presented to substantiate the assertion that the Pentland Firth as a whole will be utilised by the east coast population of Atlantic salmon. It would certainly be extremely unlikely, and contrary to any evidence that we are aware of, that the entire width of the Pentland Firth would be utilised evenly. Whilst we accept that any potential barrier effect would only present itself when the turbines are operational, and that other migration routes might be available, we do not accept that such an effect would be of minor significance.

Impact 13.17: Collision with turbines

We have a number of difficulties with the approach employed to determine the risk of collision with turbines. One aspect that is not considered is that fish may pass through the development area on a number of occasions. This is likely to be the case for smolts, for which the maximum swimming speeds are less than the peak tidal flow in the area (as a consequence smolts will conceivably pass through the area on a number of occasions with the ebb and flow of the tide), and for returning salmon, which could reasonably be expected to transit the area as they search for their natal river. Presumably, a number of factors which are not considered in the ES will have a significant influence on collision rate, such as visibility (strongly related to avoidance behaviour, and which will change according to time of day, season and weather conditions), and the speed at which the blades turn. In addition, for the reasons outlined above, we believe that the assumptions used in the encounter model are flawed and are not in accordance with the precaution required by the Rochdale envelope approach. In particular, the assumption in section 13.258 that the area in cross section of the Pentland Firth occupied in the tidal array can be used as a proxy for the proportion of salmon that utilise the Inner Sound is flawed and has no ecological basis. On that basis we do not accept the assertion that the impact significance is not significant.

Conclusion

As stated above, ASFB recognises the importance of offshore renewable energy. However, the environmental statement has failed to demonstrate that the development will not adversely affect the integrity of the SAC rivers around Scotland. Where a Natura site is involved, the onus is on the developer to demonstrate no impact and in the absence of that the precautionary principle will apply. Under these circumstances, we do not consider that the proposed development is compatible with the requirements of the Habitats Directive or Scotland's Marine Nature Conservation Strategy. On that basis, we have no alternative but to formally object to the proposed development, until adequate monitoring and mitigation strategies have been put in place.

It should be emphasised that we have no wish to prevent or delay the proposed development unnecessarily and we remain keen to work constructively with the developers, Marine Scotland and Crown Estate to identify appropriate monitoring programmes which will allow us to be able to assess the acknowledged risks of this development, and other proposed developments in the Pentland Firth more appropriately. We stated in our introduction that we believe that a formal mitigation agreement should be a condition of consent. In addition, there is a clear and urgent need to fund, plan and start strategic research on the movement, abundance, swimming depth, feeding behaviour etc. of salmon and sea trout. Such research would clearly feed into the potential mitigation measures that might be deemed appropriate, and the conditions under which such mitigation should be enacted. One aspect that should be considered immediately is the installation of fish counters, particularly in SAC rivers, to allow the real time understanding of adult salmon abundance (and depending on local conditions, new technology might even allow information on smolt escapement to be

collected). We believe that the installation of such counters, in close liaison with the DSFBs in question and MSS, could potentially be considered as a condition of consent, where appropriate to local conditions, should such consent ultimately be granted. Developers should be encouraged to work together to fund such strategic monitoring, including the on-going costs of operating such counters, in order to allow more certainty for all involved.

The advent of tidal turbines and other technical approaches to marine renewables development represents a step-change in the exposure of marine animals of high cultural and economic significance to attendant risks. In many cases, understanding of the risks is insufficient to support proposals for mitigation even at this late stage when substantial developments are being submitted for licensing. The cumulative impact of the MeyGen proposal and those developments that are likely to follow during the next decade or so is potentially even greater. We would therefore recommend that an expert group is set up to rapidly consider the best way forward to plug the considerable knowledge gaps that remain. It is important that the best scientific and biological talent is made available to find practicable ways to address the unresolved issues. ASFB would be very keen to constructively engage with such a group.

For further information please contact:

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